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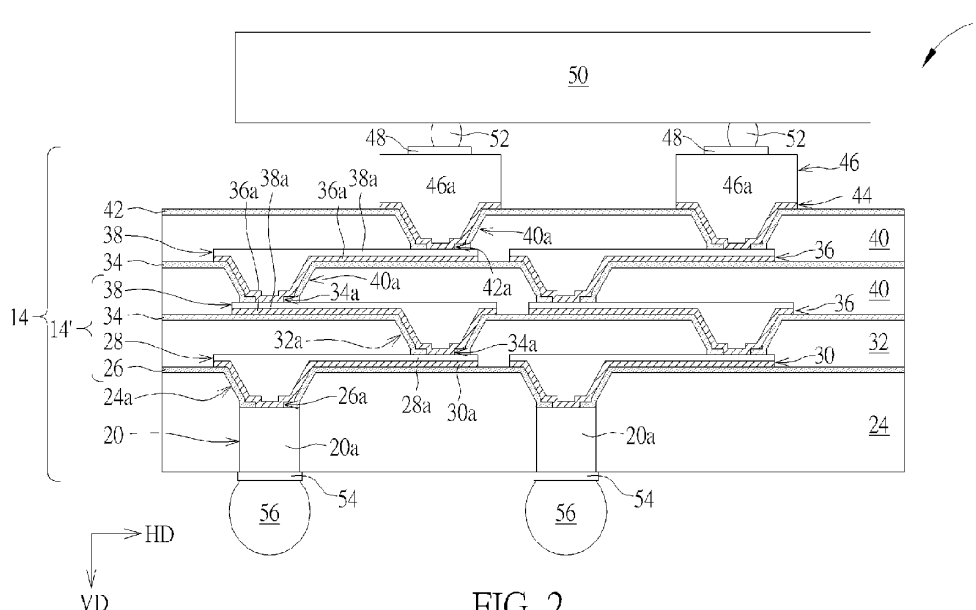
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(54) **PACKAGE DEVICE**

(57) A package device (1, 2, 3, 4, 5, 6) is provided and includes a first circuit layer (20, 28, 38), a first isolation layer (24, 32, 40), and a first de-warpage layer (58, 26, 34). The first circuit layer (20, 28, 38) and the first

isolation layer (24, 32, 40) are stacked on each other. At least a portion of the first de-warpage layer (58, 26, 34) is disposed between the first circuit layer (20, 28, 38) and the first isolation layer (24, 32, 40).



**FIG. 2**



## EUROPEAN SEARCH REPORT

Application Number

EP 22 18 3767

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	<b>KR 2020 0028315 A (TAIWAN SEMICONDUCTOR MFG CO LTD [TW])</b> <b>16 March 2020 (2020-03-16)</b> * paragraphs [0004] - [0006], [0009] * * paragraphs [0014], [0016], [0018] - [0021] * * paragraph [0024] - paragraph [0039]; figures 6-10 * * paragraphs [0040] - [0047]; figures 13, 14 *	1-4, 7, 10, 13-15	INV. H01L23/498 H01L23/00
X	<b>US 2014/021617 A1 (LU CHUN-HUNG [TW] ET AL) 23 January 2014 (2014-01-23)</b> * paragraphs [0002], [0004], [0008], [0009], [0017] * * paragraph [0026] - paragraph [0041] * * paragraphs [0043], [0044] * * figures 3B, 4A, 4B *	1, 7-9	
X	<b>US 2021/076491 A1 (KIJIMA MASAHIKO [JP]) 11 March 2021 (2021-03-11)</b> * paragraph [0007] - paragraph [0011] * * paragraph [0055] - paragraph [0079] * * figure 5 *	1, 7-9	TECHNICAL FIELDS SEARCHED (IPC) H01L
X	<b>EP 1 011 139 A1 (IBIDEN CO LTD [JP]) 21 June 2000 (2000-06-21)</b> * paragraphs [0001], [0021] - [0026] * * paragraph [0084] - paragraph [0104] * * paragraphs [0105], [0106] * * paragraph [0108] - paragraph [0116] * * figure 10 *	1, 7-9	
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		15 April 2023	Keller, Jan
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			



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**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

**LACK OF UNITY OF INVENTION**

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

**see sheet B**

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☒ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

**1-4, 7-10, 13-15**

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

**LACK OF UNITY OF INVENTION  
SHEET B**

Application Number

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The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

**1. claims: 1-4, 7, 10, 13-15**

**A package device comprising a circuit layer, an isolation layer, and a de-warpage layer.**

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**2. claim: 5**

**A package device comprising a circuit layer, an isolation layer, and a de-warpage layer, and the isolation layer comprising through holes into which the de-warpage layer extends.**

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**3. claim: 6**

**A package device comprising a circuit layer, an isolation layer, and a de-warpage layer further comprising seed layers.**

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**4. claims: 8, 9**

**A package device comprising a circuit layer, an isolation layer, and at least two de-warpage layers.**

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**5. claim: 11**

**A package device comprising a circuit layer, an isolation layer, and a de-warpage layer, wherein the isolation layer contacts the circuit layer.**

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**6. claim: 12**

**A package device comprising a circuit layer, an isolation layer, and a de-warpage layer, wherein the de-warpage layer consists of blocks which correspond to traces in the circuit layer.**

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

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